Presentation prepared for:

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Evaluating Effectiveness of Mitigation

1. What are the goals?
2. How should we prioritize goals?
3. How is effectiveness evaluated?
4. What is effectiveness of available methods?
5. What is needed to improve understanding?

What are the Goals of Mitigation?

- Protect ecosystems, species, populations, individuals
- Reduce exposure to sound
- Goals vary with species: protecting rare, endangered, endemic, or especially sensitive species may drive goals
- Goals vary with region/country/laws
- Mitigation goals should follow from evaluation of the threats
- Goals should be clearly defined in advance (strategic planning)
- Communication, public participation and local input are very important in defining goals
- Mitigation should be cost effective and minimize interference with operational goals of sound producers
- Appearance/expectation: "must do something", "every little bit helps"
- Collect data to improve future mitigation.

How do we Prioritize Goals?

- Get input from a broad range of stakeholder – communication
- Listen to the experts, solicit information
- Surveys prior to designing mitigation approach
- Apply knowledge from elsewhere
- Examine species vulnerability – rareness, endangered status, sensitivity to sound sources
- Risk assessment / Environmental Impact Assessment
- Sensitivity to geographic, national, cultural difference

How is Effectiveness Evaluated?

- Establish a monitoring program
- Analyze available data from monitoring efforts (Stone report of JNCC)
- Establish standards for data collection and recording to facilitate analysis
- Make observations from independent platform/controlled studies.
- External review – common sense and expert opinion
- Need to evaluate effectiveness of all mitigation measures working in combination
- Are goals being met?

- Basic dichotomy: Is the mitigation strategy effective?
  How good are we at implementing it?

How Effective Are Current Methods?
What is Needed to Improve Methods?

1. Modify sound source or how it is used
2. Habitat avoidance
3. Soft-start, ramp-up
4. Detection/Avoidance/Shut-Down
5. Alarms
6. Sound screens

Common Themes for All Methods

- Effectiveness varies with species
- Behavioral responses are critical but are largely unknown
- Many methods have a potential for unanticipated adverse effects (eg. soft-start, shut-down, & alarms all have the potential of increasing the total sound exposure)

Agreements: Effective Strategies

•Habitat avoidance (geographically or seasonally) may have great benefits with few downsides.

•Reducing total sound production (reducing amplitude, improving signal processing, eliminating useless/accidental sound, sound screens) also holds considerable promise

Need for More Research

•Soft-start has many proponents, but some remain skeptical of effectiveness.

•Detection/avoidance/shutdown may be effective for some species, but detection probabilities need to be improved for other species.

•Alarm signals may have unexplored potential, but more information is needed.